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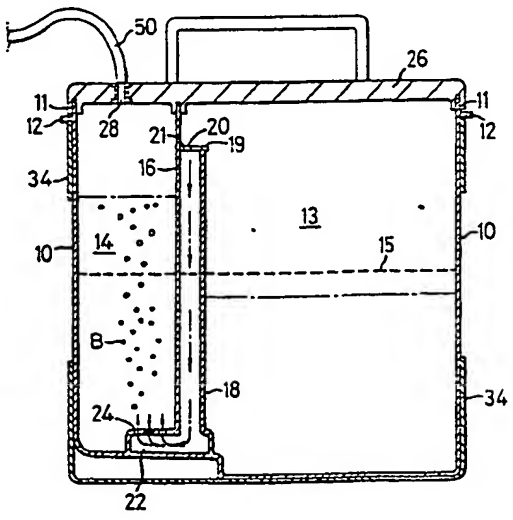
(54) Oxygen generator.

(57) An oxygen generator comprises a container having formed therein first and second chambers divided by a substantially vertical partition. Oxygen is generated in the first chamber and leaves via a passage extending from an upper portion of the first chamber to a lower portion of the second chamber. The oxygen is cleaned and humidified in the second chamber, and leaves via an outlet at the upper portion of the second chamber.

FIG.2



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Description . .

OXYGEN GENERATOR

Background of the Invention

The present invention relates to a portable oxygen generator. Oxygen suppliers have become popular as means for speeding up recovery from fatigue after heavy physical exercise or the like.

An oxygen supplier of this type is shown in Japanese Patent Provisional Publication 61-85969, wherein a sealed container contains peroxide and catalyst into which water is put to generate oxygen. The oxygen is aspirated through a hose.

Because this supplier has no cleaning or humidifying channels for the generated oxygen, the oxygen is not suitable for direct human respiration. In particular, if aspirated for about five minutes or longer, the dry oxygen generated is liable to have a negative effect on the human body.

Moreover, because heat is produced by the reaction that generates oxygen, consideration must be given to the heat resistance and heat insulation of the container, making the container more complex and expensive.

Summary of the Invention

It is a general object of this invention to provide a portable oxygen generator which generates clean and humid oxygen, and which can be made of inexpensive plastic without problems of reaction heat.

An oxygen generator according to the invention comprises a container and a top lid. The inside of the container is divided into a reaction chamber and a cleaning/humidifying chamber, which has gas outlet means adjacent the top. A gas passage extends within the container, and opens at one end into an upper portion of the reaction chamber and at the other end into a lower portion of the other chamber.

Brief Explanation of the Drawings

A preferred embodiment of the invention is shown in the accompanying drawings, wherein:

Fig. 1 is a perspective view of a portable oxygen generator according to the invention;

Fig. 2 is an enlarged cross-sectional view along line 2-2 of Fig. 1;

Fig. 3 is an enlarged cross-sectional view along line 3-3 of Fig. 1;

Fig. 4 is a front view of the mask shown in Fig. 1;

Fig. 5 is a side view of the mask.

Detailed Description of the Invention

With reference to Figs. 1-2, the oxygen generator is made of plastic and includes a container 10 having an open top end. The container 10 is formed with a top rim 11 and an outer flange 12 adjacent the top. The inside of container 10 is partitioned into two chambers 13 and 14 by a vertical wall 16, which is formed integrally with a vertical tube 18.

The tube 18 has a top inlet which opens into an upper portion of the larger chamber 13 through a check valve 19. This valve 19 is mounted pivotably on a horizontal axis 21, and has a hole 20 which is small enough to resist liquid flow from the first chamber 13. The tube 18 has a bottom outlet port 22 formed with a number of blowout holes 24 with a diameter of 1-1.5 mm, which open into a lower portion of the smaller chamber 14.

A lid can fit tightly over the top rim 11 of container 10 and the top end of partition 16. The lid 26 is formed with an outlet hole 28 over the smaller chamber 14. As shown in Figs. 1 and 3, the lid 26 has a pivotable latch 30 supported on a horizontal axis 32 on each side.

A decorative case or shell 34 surrounds the container 10 and has a top end engaging the flange 12. As shown in Fig. 3, the top end of case 34 is formed with a hook 36 extending outwardly adjacent and for engagement with each latch 30. The hook 36 is formed with a horizontally elongated groove 38 in its upper surface.

As shown in Fig. 3, the container flange 12 further extends outwardly adjacent and along each case hook 36, and is formed with a horizontally elongates nail 40 in its lower surface for engagemwnt with the groove 38. This engagement reinforces the hook 36 and secures its engagement with the latch 30.

With reference to Figs. 1, 4 and 5, a cup-shaped plastic mask 42 has an open end 44 fitting over one's nose and mouth, and a pair of brackets or ears 46 for connection with a band (not shown).

The mask 42 has an oxygen inlet nozzle 48 formed therethrough at a lower position adjacent the other end and connected through a hose 50 to the lid hole 28. The mask 42 has air inlet holes 52 formed therethrough near the nozzle 48. The mask 42 also has exhaust slits 54 formed therethrough above the nozzle 48 and holes 52.

The total area of air holes 52 is such that the amount per unit time of air flowing therethrough from outside is 3 to 6 times that of oxygen supplied through the nozzle 48.

For example, when the average volume of air taken in per respiration is 0.5 liter, and the respiration rate is 15-25 times per minute, the oxygen concentration in the total volume of air is 40-60%. Therefore, when the amount of oxygen supplied through the nozzle 48 is 1.2-3 liters per minute, the amount of air taken in is in the range of 3.5-5.5 liters per minute, with a maximum of 9.5-11.3 liters per minute.

In use, with reference to Fig. 2, water is put into the chambers 13 and 14 up to a level 15 sufficiently below the top of vertical tube 18, and peroxide and catalyst are then put into the first chamber 13. Immediately thereafter, the lid 6 is closed and locked by the latches 30.

Reaction takes place in the first chamber 13 to generate oxygen. Because the reaction occurs in a large amount of water having a high thermal capacity, reaction heat is absorbed by the water so that the container 10 is not exposed directly to high

heat.

As the pressure rises, the gas flows into the tube 18, expells the water from it into the second chamber 14, and is ejected as fine bubbles B through the small holes 24 into this chamber 14. While rising through the water in the second chamber 14, the oxygen is efficiently cleaned and humidified before filling the upper space of this chamber. The gas then flows through the hose 50 into the mask 42.

If the container falls, the check valve 19 at the top of tube 18 resists liquid flow from the first chamber 13 to the second chamber 14.

Claims

1. An oxygen generator comprising a container having an open top, a lid for tightly closing said top, a substantially vertical partition forming first and second chambers within said container, a gas outlet formed in an upper portion of said second chamber, and a gas passage extending within said container and having an inlet end opening into an upper portion of said first chamber and an outlet end opening into a lower portion of said second chamber.

2. An oxygen generator according to claim 1, and further comprising a check valve at said inlet end of the passage for resisting liquid flow from said first chamber.

3. An oxygen generator according to claim 1, and further comprising blowout holes of 1-1.5 mm in diameter, through which said outlet end of the passage opens into said lower portion of the second chamber.

4. An oxygen generator according to claim 1, and further comprising a pivotable latch mounted on said lid, an outer flange formed on said container adjacent the top, a shell substantially surrounding said container, a hook extending outwardly from said shell and adapted to engage with said flange on the upper side of said hook and with said latch on the lower side.

5. An oxygen generator according to claim 1, and further comprising a mask having an open end fitting over one's nose and mouth, an inlet nozzle provided through said mask adjacent the other end at a lower position and adapted to connect with said gas outlet of the second chamber, small holes formed through said mask adjacent said nozzle, said holes having a total area such that the amount per unit time of air flowing into said mask through said holes is 3-6 times that of oxygen supplied into said mask through said nozzle, and exhaust slits formed through said mask above said nozzle and holes.

FIG.1

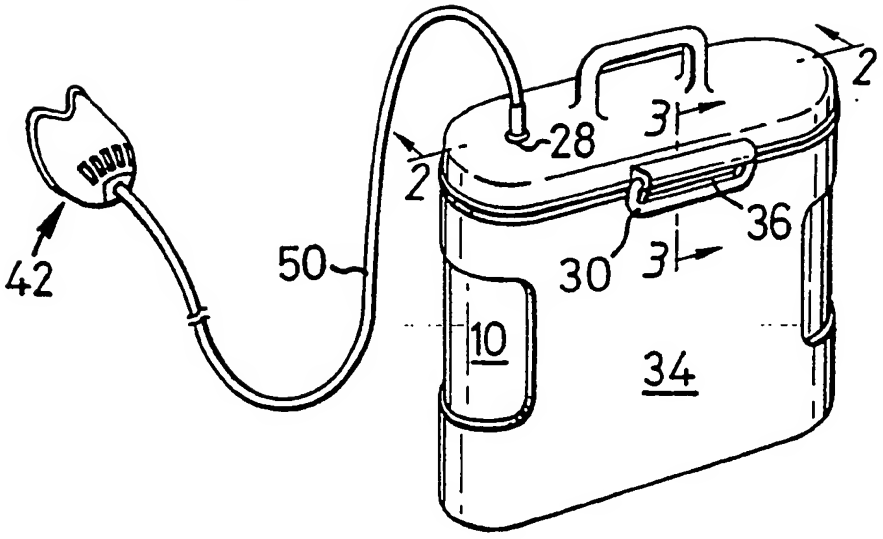

FIG.3

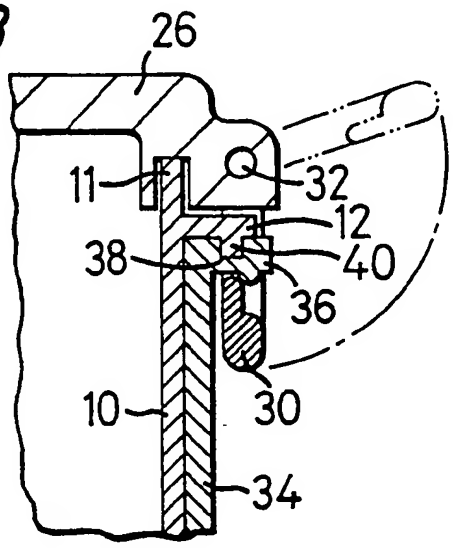

FIG. 2

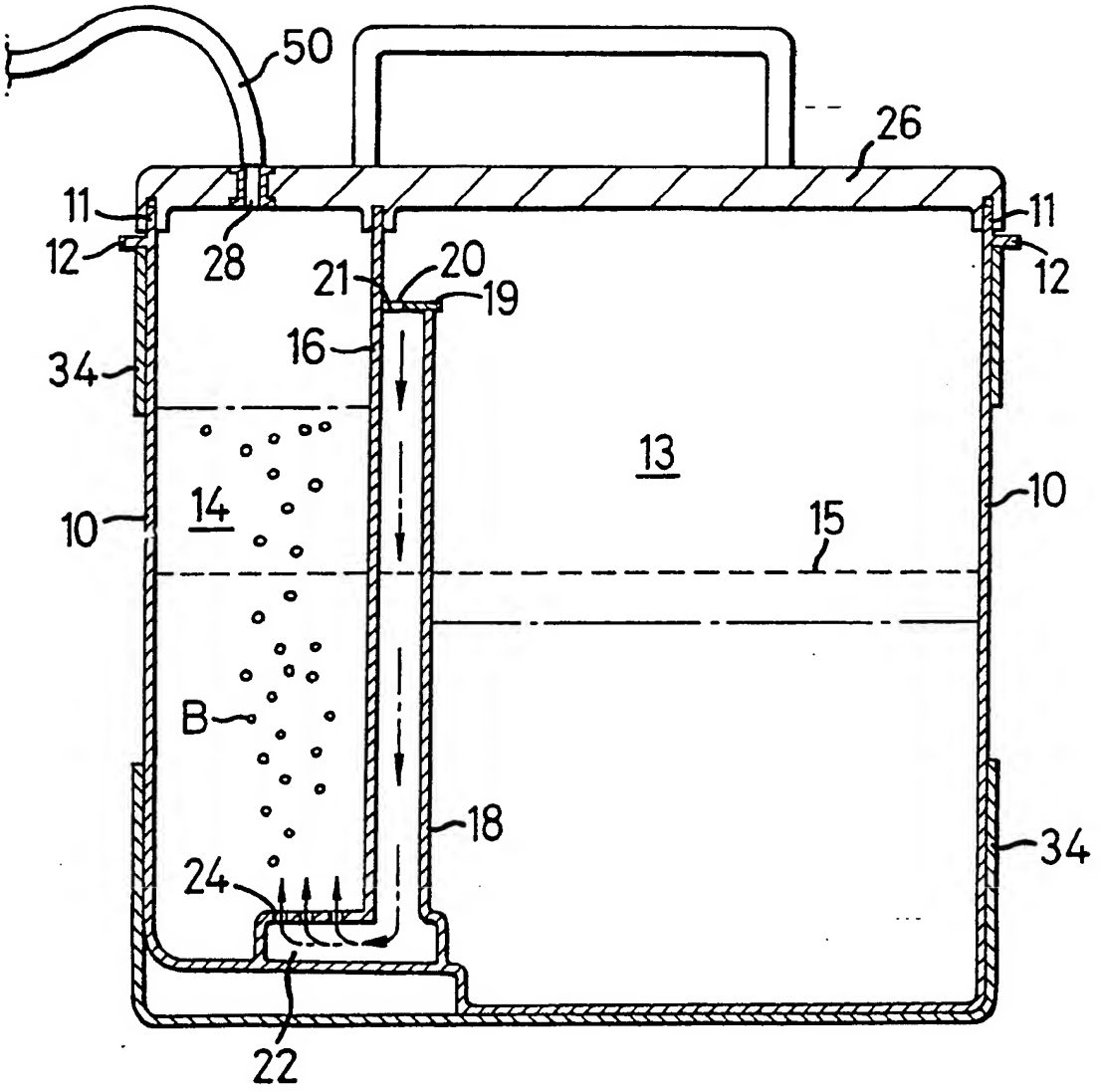

FIG.4

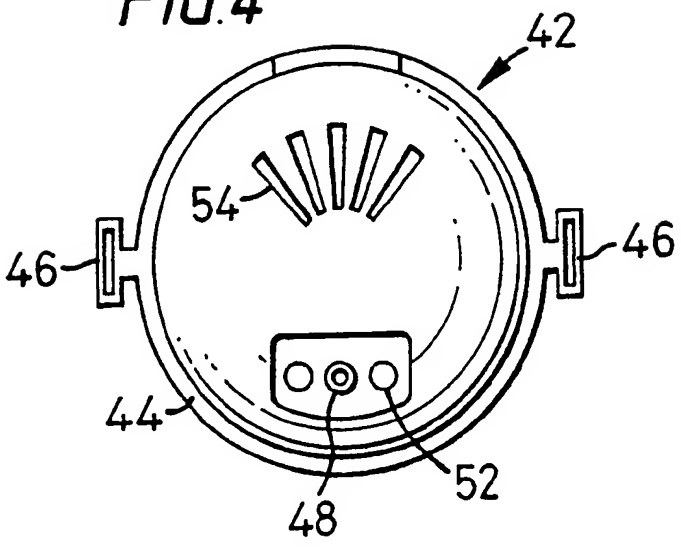

FIG.5

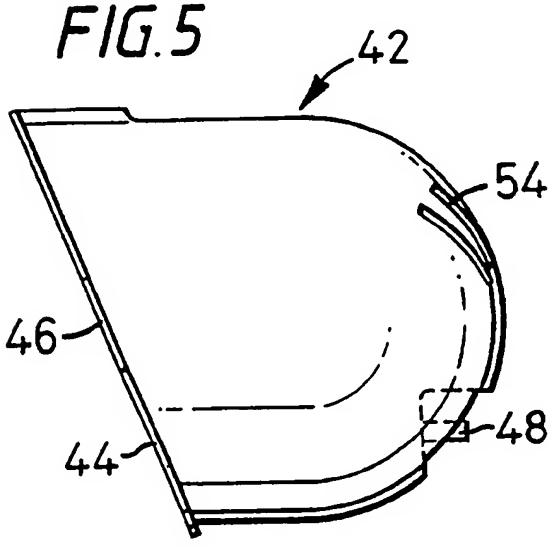

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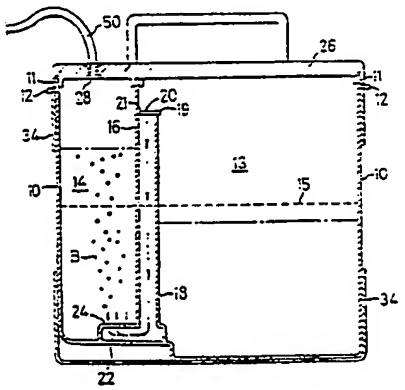
FIG. 2



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EUROPEAN SEARCH REPORT

Application Number

EP 89 30 6698

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	WO-A-8602063 (CAPRARA) * page 1, lines 1 - 4 * * page 6, line 12 - page 8, line 15; figure *	1	A62B7/08
Y		2	
A		3, 4	
X,P	WO-A-8805322 (INA) * abstract; figures *	1, 3, 4	
Y	EP-A-129854 (INTEROX) * page 1, lines 1 - 5 * * page 10, line 33 - page 11, line 21; figure 1 *	2	
A	GB-A-276/1912 (PARKER) * page 2, lines 32 - 33 * * page 3, lines 14 - 57; figures *	1, 2	
A	US-A-2775511 (GEFFROY) * figures *	3	
A	DE-A-2605173 (LIFE SUPPORT) * figures 2, 3 *	5	TECHNICAL FIELDS SEARCHED (Int. Cl.5) A62B B01J C01B
A	EP-A-223914 (NIKKA MIKRON) * figures *	1, 3, 5	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	29 DECEMBER 1989	WALVOORT B.W.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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